



# MAGNAFLUX CORPORATION

6800 EAST WASHINGTON BLVD. • LOS ANGELES, CALIFORNIA 90040

June 17, 1974

Mr. Don Hagemaiier, Mail Code 1-18,  
Department 253  
McDONNELL DOUGLAS AIRCRAFT  
3855 Lakewood Boulevard  
Long Beach, California 90846

Subject: OSHA Requirements regarding Zyglo Penetrant Materials

Dear Don:

This is to advise that Magnaflux Corporation has available standard Zyglo penetrant materials that allow conformance to OSHA regulations 1910.108 and 1910.107 (Federal Register Volume 37, Number 116, June 15, 1972), regarding the use of flammable and combustible liquids in open dip tanks and in spray applications.

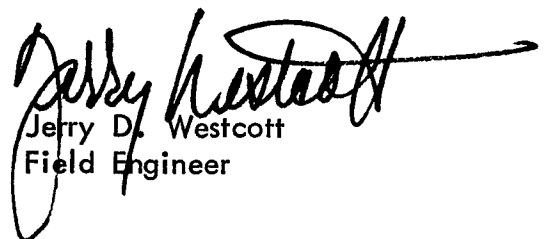
These Zyglo penetrants fall into the category of "Class III B" per OSHA paragraph 1910.106 (flash point in excess of 200°, Pensky-Martens Closed Cup), and are not subject to the special handling provisions of OSHA 1910.107 and 1910.108.

The above provisions of the Occupational Safety and Health Administration must now be given consideration when using combustible materials for either spray applications or use in open tanks, with a surface area in excess of 10 square feet or a capacity in excess of 150 gallons.

This is to further advise that Magnaflux Corporation does not use any of the fourteen carcinogens listed by OSHA in the Federal Register, May 1973, in its expendable materials.

Yours truly,

MAGNAFLUX CORPORATION

  
Jerry D. Westcott  
Field Engineer

JDW/II

cc: Mr. Floyd Clark, McDonnell Douglas  
Mr. Ralph Cramm, McDonnell Douglas

Enclosures



JERRY D. WESTCOTT  
FIELD ENGINEER

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## CAN WE HELP YOU MEET OSHA AND EPA SAFETY REQUIREMENTS?

Magnaflux Corporation has a complete series of full spectrum liquid penetrant materials to enable you to conduct your penetrant inspection requirements within the parameters of both OSHA and the Environmental Protection Agency established under the Federal Clean Air Act.

Zyglo Formula "B" cleaners, penetrants, and developers are rated as class IIIB liquids and have flash points over 200°F evaluated by the Pensky-Martens closed cup method. Class IIIB materials, per OSHA\* 1910.106, are not subject to the special handling provisions of OSHA 1910.107, and 1910.108.

These provisions of the Occupational Safety and Health Administration must be given consideration when contemplating use of combustible materials for either spray application or use in open tanks with a surface area in excess of 10 sq. ft. or a capacity in excess of 150 gallons.

Formula "B" Zyglo materials also conform to the requirements of MIL-1-25135, MIL Standard 271, and other pertinent specifications of both government and industry.

For further information, contact your Magnaflux field engineer. He can help in many other areas, too. Perhaps you're experiencing difficulty in selecting an appropriate vehicle for your Magnaflux or Magnaglo bath suspension? He can recommend materials (specific oils or possibly even water) that will perform within both NDT and safety parameters. Why not give him a call today? He'll be glad to discuss any or all of your safety and testing needs.

\*Federal Register Volume 37, Number 116, June 15, 1972.



**MAGNAFLUX CORPORATION**

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## DEPARTMENT OF LABOR

Occupational Safety and Health  
Administration

[ 29 CFR Part 1910 ]

### OCCUPATIONAL SAFETY AND HEALTH STANDARDS

#### Definitions of "Flammable Liquid" and "Combustible Liquid"; Deter- mination of Flashpoints

The Occupational Safety and Health Administration of the Department of Labor and the Hazardous Materials Regulations Board of the Department of Transportation have determined, following a coordinated study of technical differences in their respective regulations concerning flammable liquids, that it is in the interest of persons affected thereby and sound administration that the regulations be brought into uniformity. Uniformity would facilitate the proper identification, classification, and control of flammable and combustible liquids in places of employment and in transportation.

Accordingly, pursuant to authority in section 6(b) of the Williams-Steiger Occupational Safety and Health Act of 1970 (84 Stat. 1593; 29 U.S.C. 655) and in 29 CFR 1910.4, it is proposed to amend §§ 1910.106 and 1910.108 of Title 29 of the Code of Federal Regulations in the manner set forth below.

The proposed amendments regarding the definition of "flammable liquid" and the procedure for determining flashpoints are similar to corresponding amendments proposed by the Hazardous Materials Regulations Board of the Department of Transportation and published in the FEDERAL REGISTER on this date. The other proposed amendments would make conforming changes in §§ 1910.106 and 1910.108 so as to preserve substantially unchanged the present standards concerning flammable and combustible liquids.

The major proposed changes are the following:

(1) The class of "flammable liquids" would be limited to liquids with flashpoints below 100° F. (37.8° C.), to be known as Class I liquids.

(2) Class II liquids, presently designated as flammable, would be redesignated combustible. This would not cause a substantive change in the handling or storage procedures, because the present flammable liquids standard would also be changed so as to continue present substantive requirements for the various numbered classes.

(3) The new definitions of "flashpoint" for both flammable and combustible liquids would provide an exception for liquids which have a positive flashpoint test within the given range, but which are composed of at least 99 percent by volume of materials with flashpoints in a higher range, or materials that are non-flammable or noncombustible. This exception is proposed because the closed cup tester may concentrate highly volatile traces and give an abnormally low flashpoint that would not reasonably represent the liquid in its normal use.

(4) An additional, partial evaporation procedure and second test would be required for liquids which are mixtures of compounds with different flashpoints and different volatilities. The lower flashpoint would apply. Such a procedure would more realistically determine the flashpoint of a mixture that includes a highly volatile, nonflammable component.

(5) The latest American Society for Testing and Materials (ASTM) procedures for testing nonviscous and viscous flammable and combustible liquids (ASTM D56-70, and ASTM D93-71, respectively) would be adopted, since they are operative over the entire range of flammable and combustible liquids as redefined. Earlier editions of these tests are presently specified.

(6) The terms "viscous" and "SUS" would be defined, and a procedure specified for determining viscosity.

(7) A number of changes would be made in §§ 1910.106, 1910.108, to replace the phrase "flammable liquid" with "Class I or Class II liquid." There is no need to replace the phrase "flammable or combustible liquid" since this phrase still refers to the entire range of liquids concerned.

(8) The footnote in the present paragraph (a) (19) of § 1910.106 regarding the classification of liquids at elevated temperatures would be deleted; a quantitative interpretation of the footnote would be placed in paragraph (a) (18) to permit proper classification of heated combustible liquids.

11901

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Occupational Safety and Health Administration

Interested persons are invited to submit written data, views, and arguments concerning this proposal within 30 days after its publication in the FEDERAL REGISTER. The submissions may be mailed to the Office of Standards, Room 305, 400 Street NW., Washington, DC 20210. Within 30 days after the publication of this proposal in the FEDERAL REGISTER, any interested person may also file with the Office of Standards written objections, stating the grounds therefor and requesting a public hearing on the objections. The request for a hearing must specify the part of the proposal to which objection is made and must contain a concise summary of the evidence that would be adduced at the hearing in support of each objection made.

1. Paragraph (a) of § 1910.106 is proposed to be amended by revising subparagraphs (14), (18), and (19), and by adding new subparagraphs (37) and (38), to read as follows:

**§ 1910.106 Flammable and combustible liquids.**

**(a) Definitions.**

(14) "Flashpoint" means the minimum temperature at which a liquid gives off vapor within a test vessel in sufficient concentration to form an ignitable mixture with air near the surface of the liquid, and shall be determined as follows:

(i) For a liquid which has a viscosity of less than 45 SUS at 100° F. (37.8° C.), does not contain suspended solids, and does not have a tendency to form a surface film while under test, the procedure specified in the Standard Method of Test for Flashpoint by Tag Closed Tester (ASTM D56-70) shall be used.

(ii) For a liquid which has a viscosity of 45 SUS or more at 100° F. (37.8° C.), or contains suspended solids, or has a tendency to form a surface film while under test, the procedure specified in the Standard Method of Test for Flashpoint by Pensky-Martens Closed Tester (ASTM D93-71) shall be used.

(iii) For a liquid that is a mixture of compounds that have different volatilities and flashpoints, its flashpoint shall be determined by using the procedure specified in subdivision (i) or (ii) of this subparagraph on the liquid in the form it is shipped, and on a partially evaporated sample of the liquid obtained by placing a measured volume of the liquid in an open vessel at room temperature between 70°-80° F. (21.1° C-26.7° C.) until 10 to 15 percent of the sample by volume is evaporated. The lower value of the two tests shall be the flashpoint of the material.

(18) "Combustible liquid" means any liquid having a flashpoint at or above 100° F. (37.8° C.). Combustible liquids shall be divided into two classes as follows:

(i) "Class II liquids" shall include those with flashpoints at or above 100° F. (37.8° C.) and below 140° F. (60° C.), except any mixture having components with flashpoints of 200° F. (93.3° C.) or higher, the total volume of which make up 99 percent or more of the total volume of the mixture.

(ii) "Class III liquids" shall include those with flashpoints at or above 140° F. (60° C.). Class III liquids are subdivided into two subclasses:

(a) Class IIIA liquids shall include those with flashpoints at or above 140° F. (60° C.) and below 200° F. (93.3° C.), except any mixture having components with flashpoints of 200° F. (93.3° C.) or higher, the total volume of which make up 99 percent or more of the total volume of the mixture.

(b) Class IIIB liquids shall include those with flashpoints at or above 200° F. (93.3° C.). This section does not cover Class IIIB liquids. Where the term "Class II liquids" is used in this section, it shall mean only Class IIIA liquids.

(iii) When a combustible liquid is heated for use to within 30° F. (16.7° C.) of its flashpoint, it shall be handled in accordance with the requirements for the next lower class of liquids.

(19) "Flammable liquid" means any liquid having a flashpoint below 100° F. (37.8° C.), except any mixture having components with flashpoints of 100° F. (37.8° C.) or higher, the total of which make up 99 percent or more of the total volume of the mixture. Flammable liquids shall be known as Class I liquids. Class I liquids are divided into three classes as follows:

(i) Class IA shall include liquids having flashpoints below 73° F. (22.8° C.) and having a boiling point below 100° F. (37.8° C.).

(ii) Class IB shall include liquids having flashpoints below 73° F. (22.8° C.) and having a boiling point at or above 100° F. (37.8° C.).

(iii) Class IC shall include liquids having flashpoints at or above 73° F. (22.8° C.) and below 100° F. (37.8° C.).

(37) "S.U.S." means Saybolt Universal Seconds as determined by the Standard Method of Test for Saybolt Viscosity (ASTM D88-56), and may be determined by use of the SUS conversion tables specified in ASTM Method D2161-66 following determination of viscosity in accordance with the procedures specified in the Standard Method of Test for Viscosity of Transparent and Opaque Liquids (ASTM D445-65).

(38) "Viscous" means a viscosity of 45 S.U.S. or more.

2. Paragraph (d) of § 1910.106 is proposed to be amended by revising paragraphs (1) (i), (3) (i), 5 (iv) (b), (7), to read as follows:

**§ 1910.106 Flammable and combustible liquids.**

(d) **Container and portable tank storage—**(1) *Scope*

(ii) *Exceptions.* This paragraph shall not apply to the following:

(a) Storage of containers in bulk plants, service stations, refineries, chemical plants, and distilleries;

(b) Class I or Class II liquids in the fuel tanks of a motor vehicle, aircraft, boat, or portable or stationary engine;

(c) Flammable or combustible paints, oils, varnishes, and similar mixtures used for painting or maintenance when not kept for a period in excess of 30 days;

(d) Beverages when packaged in individual containers not exceeding 1 gallon in size.

(3) *Design, construction, and capacity of storage cabinets—*(1) *Maximum capacity.* Not more than 60 gallons of Class I or Class II liquids, or more than 120 gallons of Class III liquids may be stored in a storage cabinet.

(5) *Storage inside building*

(iv) *Mercantile occupancies and other retail stores.*

(b) Where the aggregate quantity of additional stock exceeds 60 gallons of Class IA, or 120 gallons of Class IB, or 180 gallons of Class IC, or 240 gallons of Class II, or 500 gallons of Class III liquids, or any combination of Class I and Class II liquids exceeding 240 gallons, it shall be stored in a room or portion of the building that complies with the construction provisions for an inside storage room as prescribed in subparagraph (4) of this paragraph. For water miscible liquids, these quantities may be doubled.

(7) *Fire control—*(i) *Extinguishers.* Suitable fire control devices, such as small hose or portable fire extinguishers, shall be available at locations where flammable or combustible liquids are stored.

(a) At least one portable fire extinguisher having a rating of not less than 12-B units shall be located outside of, but not more than 10 feet from, the door opening into any room used for storage.

(b) At least one portable fire extinguisher having a rating of not less than 12-B units must be located not less than 10 feet, nor more than 25 feet, from any Class I or Class II liquid storage area located outside of a storage room but inside a building.

(5) **Fixed electrostatic spraying equipment.** The provisions of paragraph (h) of this section and other subparagraphs of this paragraph shall apply to fixed electrostatic equipment, except that electrical equipment not covered therein shall conform to subparagraph (1) of this paragraph.

(6) **Electrostatic hand spraying equipment.** The provisions of paragraph (1) of this section and other subparagraphs of this paragraph shall apply to electrostatic handguns when used in powder coating, except that electrical equipment covered therein shall conform to subparagraph (1) of this paragraph.

(7) **Electrostatic fluidized beds.** (1) Electrostatic fluidized beds and associated equipment shall be of approved design. The maximum surface temperature of this equipment in the coating process shall not exceed 150° F. The high voltage circuits shall be so designed as not to produce a spark of sufficient intensity to ignite any powder-air mixtures resulting in appreciable shock hazard when coming in contact with a grounded object under normal operating conditions.

(2) Transformers, powerpacks, control apparatus, and all other electrical portions of the equipment, with the exception of the charging electrodes and their connections to the power supply shall be located outside of the powder coating booth or shall otherwise conform to the requirements of subparagraph (1) of this paragraph.

(3) All electrically conductive objects in the charging influence of the electrodes shall be adequately grounded. The powder coating equipment shall carry a prominent, permanently installed warning regarding the necessity for grounding objects.

(4) Objects being coated shall be maintained in contact with the conveyor or other support in order to insure proper coating. Hangers shall be regularly inspected to insure effective contact and edges of contact shall be sharp points or edges where possible.

(5) The electrical equipment shall be interlocked with the ventilation system so that the equipment cannot be operated unless the ventilation fans are in operation.

(6) **Organic peroxides and dual component coatings.** (1) **Conformance.** All operations involving the use of organic peroxides and other dual component coatings shall be conducted in accordance with the requirements of NFPA No. 68 and NFPA No. 69.

(2) **Smoking.** Smoking shall be prohibited and "No Smoking" signs shall be prominently displayed and only non-coating dusting tools shall be used in any area where organic peroxides are stored, handled, or applied.

(3) **1910.108 Dip tanks containing flammable or combustible liquids.**

(4) **Definitions applicable to this section.** (1) **Dip tank.** Shall mean a tank, color bucket, container of flammable or combustible liquid in which articles or material powder are immersed for the purpose of

coating, finishing, testing, or similar processes.

(2) **Vapor area.** Shall mean any area containing dangerous quantities of flammable vapors in the vicinity of dip tanks, their drainboards or associated drying, conveying, or other equipment, during operation or shutdown periods.

(3) **Approved.** Unless otherwise indicated, approval or listing by at least one of the following nationally recognized testing laboratories: Underwriters Laboratories, Inc.; Factory Mutual Engineering Corp.

(4) **Listed.** See "approved" in § 1910.108 (a) (3).

(5) **Ventilation.** (1) **Vapor area ventilation.** Vapor areas as defined in paragraph (a) of this section shall be limited to the smallest practical space by maintaining a properly designed system of mechanical ventilation arranged to move air from all directions towards the vapor area origin and thence to a safe outside location. Ventilating systems shall conform to the Standards for Blower and Exhaust Systems (NFPA Pamphlet No. 91-1969). Required ventilating systems shall be so arranged that the failure of any ventilating fan shall automatically stop any dipping conveyor system. See also paragraph (c) (6) of this section.

(2) **Ventilation combined with drying.** When a required ventilating system serves associated drying operations utilizing a heating system which may be a source of ignition, means shall be provided for prevention before the heating system can be started; the failure of any ventilating fan shall automatically shut down the heating system; and the installation shall otherwise conform to the Standard for Ovens and Furnaces (NFPA No. 36A-1969).

(3) **Construction of dip tanks.** (1) **General.** Dip tanks, including drainboards if provided, shall be constructed of substantial noncombustible material, and their supports shall be of heavy metal, reinforced concrete, or masonry. Where dip tanks extend through a floor to the story below or where the weakening of the tank supports by fire may result in the tank collapse, supports should be of material having not less than 1-hour fire resistance.

(2) **Overflow pipes.** (i) Dip tanks of over 150 gallons in capacity or 10 square feet in liquid surface area shall be equipped with a properly trapped overflow pipe leading to a safe location outside the building. Smaller dip tanks should also be so equipped, where practical. The discharge of the overflow pipe should be so located and arranged that if the entire combustible contents of the dip tank is overflowed through overflow pipe by the application of water during fire fighting, property will not be endangered. The size of the overflow pipe should be sufficient to conduct the maximum rate of flow of water expected to be applied to the liquid surface of the dip tank from automatic sprinklers or from other sources in the event of fire.

(ii) Overflow pipes shall be of sufficient capacity to overflow the maximum delivery of dip tank liquid fill pipes but

shall not be less than 3 inches in diameter and shall be increased in size depending upon the area of the liquid surface and the length and pitch of pipe.

(iii) Piping connections on drains and overflow lines shall be designed so as to permit ready access for inspection and clearing of the interior.

(iv) The bottom of the overflow connection shall be not less than 6 inches below the top of the tank. See also subparagraph (6) of this paragraph and paragraph (g) (3) (ii) of this section.

(5) **Bottom drains.** (i) Dip tanks over 500 gallons in liquid capacity shall be equipped with bottom drains automatically and manually arranged to quickly drain the tank in the event of fire, unless the viscosity of the liquid at normal atmospheric temperature makes this impractical. Manual operation shall be from a safely accessible location. Where gravity flow is not practicable, automatic pumps shall be required.

(ii) Such drain shall be trapped and discharge to a closed properly vented salvage tank or to a safe location outside which will not endanger property.

(iii) According to tank capacity the diameter of bottom drain pipe shall be not less than the following:

Gallons:	Inches
500 to 750.....	3
750 to 1,000.....	4
1,000 to 2,500.....	5
2,500 to 4,000.....	6
Over 4,000.....	8

(4) **Salvage tanks.** The capacity of the salvage tank shall be greater than the capacity of the dip tank or tanks to which they are connected.

(5) **Automatic extinguishing facilities.** Except as noted in paragraph (h) (1) (v) of this section (applying to hardening and tempering tanks), all dip tanks exceeding 150 gallons liquid capacity or having a liquid surface area exceeding 4 square feet shall be protected with at least one of the automatic extinguishing facilities conforming to paragraph (g) (2), (3), (4), (5), or (6) of this section.

(6) **Conveyor systems.** Dip tanks utilizing a conveyor system shall be so arranged that in the event of fire, the conveyor system shall automatically cease motion and required bottom drains shall open. Conveyor systems shall automatically cease motion unless required ventilation is in full operation. See also paragraph (b) (1) of this section.

(7) **Heating dip tank liquids.** When dip tank liquids are artificially heated, either by the dipping of heated articles, or by other application of heat to the liquid, provision shall be made to prevent a temperature rise greater than 50° F below the flashpoint of the liquid. See also paragraph (h) (1) of this section.

(8) **Liquids used in dip tanks, draining and handling.** The storage of flammable and combustible liquids in connection with dipping operations shall conform to the requirements of section 1910.108, where applicable. Where portable containers are used for the replenishment of flammable and combustible liquids, provision shall be made so that each container and tank shall be properly

(1) When sprinklers are provided, they shall be installed in an approved manner.

(2) Open flames and smoking shall not be permitted in flammable or combustible liquid storage areas.

(3) Materials which will react with water shall not be stored in the same room with flammable or combustible liquids.

(3) Section 1910.108 is proposed to be amended by revising paragraph (h)(4) to read as follows:

§ 1910.108 Dip tanks containing flammable or combustible liquids.

(h) *Special dip tank applications.* . . .

(4) *Roll coating.* (i) The processes of roll coating, spreading, and impregnating, in which fabrics, paper, or other materials are passed directly through a tank or trough containing flammable or combustible liquids, or over the surface of a roller that revolves partially submerged in a Class I or Class II liquid, as these terms are defined in § 1910.103 (a), shall conform to the applicable requirements of paragraphs (a) through (g) of this section, and in addition shall conform to subdivision (ii) of this subparagraph.

6, 84 Stat. 1593; 29 U.S.C. 655; 29 CFR

Signed at Washington, D.C., this 12th day of June 1972.

G. C. GUENTHER,  
Assistant Secretary of Labor.

[FR Doc. 72-9036 Filed 6-14-72; 8:50 am]